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EAR-0853-65
Copy 3 of 6

Sanders Associates, Inc.
95 Canal Street
Nashua, New Hampshire

Contract No. GN-6610
AF33(657)-15233

Contract For: See Schedule

Amount: See Schedule

Mail Invoices To:

Period of Performance: See Schedule

Administrative Data: This is a Firm Fixed Price Contract

This contract is entered into by and between the United States of America, hereinafter called the Government, represented by the Contracting Officer executing this contract, and the above-named Contractor which is a corporation, incorporated in the State of Delaware hereinafter called the Contractor.

The parties hereto agree that the Contractor shall furnish the facilities and deliver all supplies and perform all the services set forth in the attached Schedule issued hereunder, for the consideration stated therein.

The rights and obligations of the parties to this contract shall be subject to and governed by the attached Schedule and the General Provisions. In the event of any inconsistency between the Schedule and the General Provisions, the Schedule shall control.

IN WITNESS WHEREOF, the parties hereto have executed this contract as of 15 DEC 1965.

25X1
SANDERS ASSOCIATES, INC.

THE UNITED STATES OF AMERICA

TITLE Manager, Contracts

BY

DATE 12 January 1966

TITLE Contracting Officer

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CERTIFICATE

25X1 I, _____, certify that I am
the Secretary _____ of the Corporation named
25X1 as Contractor herein; that _____ who
signed this contract on behalf of the Contractor was then Manager,
Contracts Administration of said Corporation; that said Contract was
duly signed for and in behalf of said Corporation by authority of
its governing body, and is within scope of its Corporate Powers.

(Corporate Seal)

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Contract No. GN-6610
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SCHEDULE

PART I - MATERIAL AND SERVICES TO BE FURNISHED

The Contractor shall furnish the necessary material and services to deliver reports of studies and related items as set forth below:

Item I Infrared Study Program

The Contractor shall furnish materials, administrative services, engineering services, and simulator/computer facilities to analyze and evaluate the IR threat to a Mach 3 aircraft, and determine appropriate threat reduction techniques as outlined in the following program:

a. Introduction

The proposed study program will be designed to provide a reasonable basis for the implementation of hardware for the protection of a high performance Mach 3 aircraft against any IR threat either existing or projected in the reasonable future. The following description outlines the studies to be accomplished based on present intelligence information; if necessary however, they will be modified in accordance with more highly classified information which may be obtained after contract award. For expository purposes, a four-phase program which includes the following four major areas will be considered:

1. An examination of existing radiation measurements
2. A definition of the existing and projected threat
3. A theoretical and experimental study to compare techniques of threat reduction, and
4. A hardware specification for protection of the aircraft.

The ultimate goal of this study is to derive a realistic plan for a program to protect a high performance aircraft against IR threats.

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b. Radiation Patterns

An examination of the radiation emitted by a high performance aircraft will be performed in order to define maximum and minimum launch ranges for IR missiles, and maximum detection ranges for IR detection devices. It is expected that Sanders Associates, Inc. will perform this phase of the program in close coordination with both the Air Force and the airframe manufacturer. As a result of this phase of the study, it may become necessary to perform further measurements. Ground measurements, airborne measurements, and model measurements will be considered during this phase and appropriate action will be recommended.

c. The Threat

A detailed examination of the present missile threats will be performed. "All source" data will be utilized for this study. It will include a detailed examination of the threat posed by such existing U. S. Missiles as the Sidewinder 1A and 1C, Falcon 2A, 4A and the Red Eye. The Soviet AA2 and AA3 and a proposed IR tracker on the Guideline SAM missile will also be examined as they apply to this problem. These missiles will be examined with regard to their effectiveness when employed as a weapon against the high performance aircraft. Launch tactics for these weapons against a high performance aircraft will be examined. Also, the threat posed by IR target acquisition devices such as the AAA4 search and track IR radar will be examined. All available intelligence information on Soviet IR fire control devices as well as ground-to-air missiles will be investigated. During this phase of the program it is expected that appropriate need to know will be arranged for Sanders personnel at F. T. D. and other agencies that might provide information.

During this phase of the study Sanders Associates' existing computer program will be modified to include the characteristics of a Mach 3 aircraft and to include the results of the zones as defined by radiation patterns, target maneuvers, aircraft maneuvers, and missile maneuvers. Simulated weapons will be launched against the target aircraft and trajectories computed. The use of the Eastman Kodak or the General Dynamics, Ft. Worth simulator and other facilities will be investigated, and when appropriate, suitable subcontract arrangements will be made.

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d. Techniques for Threat Reduction

In this phase of the study, all techniques which might result in a reduction of the IR threat to the high performance aircraft will be examined. This phase will include an examination of flight tactics, aircraft speed, altitude, and mission profiles to see how the threat might be reduced.

IR suppression techniques will also be examined to see if they are applicable. For example, tail pipe baffles for IR suppression, auxiliary cooling of the leading edge of the wing and engine nacelles and launch detector flare combinations will be examined.

The application of active and passive BODAR techniques will be evaluated and the reduction in IR threat that could be expected using these techniques will be defined. Both closed and open loop systems will be examined. The simulation programs developed under Item I c. above, will be used to evaluate effectiveness.

e. Hardware Specification

It is desired that as early in the program as practical, parameters which influence hardware design will be defined. The range, look-angle, search time, range of modulation frequencies, optical bandwidth, electronic bandwidth, source brightness, size, weight, and environmental parameters are among the items to be defined. The use of presently existing hardware such as acquisition radars and IR sensors will be examined for possible use in the proposed hardware. The aircraft manufacturer will be consulted to evaluate the influence of any proposed changes on aircraft performance.

f. General

Because of the difficulty of anticipating all of the techniques which may be employed during the course of this study, a greater degree of flexibility in program scheduling and specific accomplishments will be granted to the Contractor. It may be necessary to make use of Sanders Associates' optical facilities at Merrimack, the simulator at Rochester, New York, or other installations. Close technical liaison between Sanders Associates, the Air Force, the airframe manufacturer and subcontractors will be required in order to achieve the goal of the program, i.e. to arrive at a detailed plan for hardware implementation to protect the high performance aircraft from IR threats.

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Item II Data

a. Informal

1. The Contractor shall prepare informal reports necessary for the simulation or computer evaluations. Such reports will include, but not be limited to, test plan, preliminary objectives, schedule, etc. Two each copies shall be provided to the SPO.

2. Trip Reports. Trip reports defining the results and conclusions of all travel performed in support of this effort will be submitted to the SPO in two copies within one week after completion of travel.

b. Formal

1. Briefing Info: The Contractor shall prepare and submit to the SPO in report form data sufficient to prepare formal briefings to Headquarters USAF concerning the results obtained in Item I as soon as major objectives are accomplished.

2. Final Report: Three each copies of a final report summarizing the effort in Item I will also be required. The hardware specification will be included in the final report.

Item III Reports

a. Informal bi-monthly technical progress reports will be submitted by the 15th of every other month to summarize the effort during the preceeding months. Two copies will be required.

b. Monthly expenditure reports, in a format to be established by the SPO, will be submitted by the 15th of each month covering information concerning the previous month. The report will cover financial information only and three copies will be required; one for the Contracting Officer and two for the SPO.

PART II - PERIOD OF PERFORMANCE AND DELIVERY SCHEDULE

Item I IR Study Program - Complete by 30 [October] 1966

Item II a. Informal

1. Data Reports - As Required
2. Trip Reports - As Required

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b. Formal

1. Briefing Info - As Required
2. Final Report - 30 November 1966

Item III As Specified Therein.

PART III - INSPECTION AND ACCEPTANCE

Items I through III of PART I hereof shall be performed, inspected, accepted, and delivered in accordance with criteria established by agreement between the parties hereto. However, the Contractor shall be responsible (including shipping costs, if any) for the products of his efforts until they are delivered at the designated delivery point. The Contractor will also be responsible for the return to the Government in similar condition (less fair wear and tear) to the condition in which he received it of all items of Government furnished property and special test equipment made available to the Contractor by the Government in the pursuance of this effort.

PART IV - PRICE, CONSIDERATION, FUNDS ALLOTTED, AND PAYMENT

A. The price agreed to by the parties to this contract in consideration for the materials and services to be furnished by the Contractor, as generally outlined in PART I hereof, is Two Hundred Thirty Nine Thousand, Four Hundred Thirty One Dollars (\$239,431.00)

B. Payments hereunder shall be made in accordance with the clause of this contract entitled "Payments".

C. Of the total price of the Items under PART I the amount of \$239,431 is presently available for payment and hereby allotted to this contract. The Government may increase or decrease this amount solely at its discretion. The Government shall not be obligated to pay the Contractor under this contract any amount in excess of the sum allotted, provided however, that in the event of termination the maximum obligation of the Government shall be \$239,431.00.

PART V - PROGRESS PAYMENTS

Progress payments, which are hereby defined as payments prior to acceptance on work in progress for the Government under this contract, may be made upon the following terms and conditions:

1. The Contracting Officer, may from time to time authorize progress payments to the Contractor upon property acquired or produced and services performed by it for the performance of this

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contract: PROVIDED, that such progress payments shall not exceed 90 percent of the cost to the Contractor of the property and services upon which payment is made, which costs shall be determined from evidence submitted by the Contractor and which must be such as is satisfactory to the Contracting Officer as being representative of the value of the work already performed: PROVIDED FURTHER, that in no event shall the total of unliquidated progress payments (see 4 below) and of unliquidated advance payments, if any, made under this contract, exceed 80 percent of the total contract price of supplies or services still to be delivered.

2. Upon the making of any progress payments under this contract, title to all parts, materials, inventories, work in process and nondurable tools theretofore acquired or produced by the Contractor for the performance of this contract, and properly chargeable thereto under sound accounting practice, shall forthwith vest in the Government; and title to all like property thereafter acquired or produced by the Contractor for the performance of this contract and properly chargeable thereto as aforesaid shall vest in the Government forthwith upon said acquisition or production: PROVIDED, that nothing herein shall deprive the Contractor of any further progress of final payments due or to become due hereunder; or relieve the Contractor or the Government of any of their respective rights or obligations under this contract.

3. The Contractor represents and warrants that the property upon which any progress payment is made hereunder, shall be cleared of all liens and encumbrances of any kind whatsoever upon receipt of any progress payments.

4. In making payment for the supplies furnished hereunder, there shall be deducted from the contract price therefor a proportionate amount of the progress payments theretofore made to the Contractor, under the authority herein contained.

5. It is recognized that property (including, without limitation completed supplies, spare parts, drawings, information, partially completed supplies, work in process, materials, fabricated parts, and other things called for herein) title to which is or may hereafter become vested in the Government pursuant to this clause will from time to time be used by or out in the care, custody or possession of the Contractor in connection with the performance of this contract. The Contractor, either before or after receipt of Notice of Termination at the option

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of the Government, may acquire or dispose of property to which title is vested in the Government under this clause, upon terms approved by the Contracting Officer; PROVIDED, that after receipt of Notice of Termination any such property that is a part of termination inventory may be acquired or disposed of only in accordance with the provisions of the termination clause of this contract and applicable laws and regulations. The agreed price (in case of acquisition by the Contractor) or the proceeds received by the Contractor (in case of any other disposition), shall, to the extent that such price and proceeds do not exceed the unliquidated balance of progress payments hereunder, be paid or credited to the Government as the Contracting Officer shall direct; and such unliquidated balance shall be reduced accordingly. Current production scrap may be sold by the Contractor without approval of the Contracting Officer by the proceeds will be applied as provided in this paragraph 5, provided that any such scrap which is a part of termination inventory may be sold only in accordance with the provisions of the termination clause of this contract and applicable laws and regulations. Upon liquidation of all progress payments hereunder or upon completion of deliveries called for by this contract, title to all property (or the proceeds thereof) which had not been delivered to and accepted by the Government under this contract or which has not been incorporated in supplies delivered to and accepted by the Government under this contract and to which title has vested in the Government under this clause shall vest in the Contractor.

6. The provisions of this contract referring to "Liability for Government-furnished Property" and any other provisions of this contract defining liability for Government-furnished property shall be inapplicable to property to which the Government shall have acquired title solely by virtue of the provisions of this clause. The provisions of this clause shall not relieve the Contractor from risk of loss or destruction of or damage to property to which title vests in the Government under the provisions hereof.

7. If this contract (as heretofore or hereafter supplemented or amended) contains provisions for Advance Payments, and in addition if at the time any progress payment is to be made to the Contractor under the provisions of this progress payments clause any unliquidated balance of advance payments is outstanding, then notwithstanding any other provision of the Advance Payments Clause of this contract the net amount, after appropriate deduction for liquidation of the advance payment of such progress payment shall be deposited in the special bank account or accounts maintained as required by the provisions of the Advance Payments Clause, and shall thereafter be withdrawn only pursuant to such provisions.

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PART VI - USE OF GOVERNMENT FACILITIES AND SPECIAL TEST EQUIPMENT

In the performance of this contract, the Contractor is authorized to use, on a rent-free, non-interference, no charge for usage basis the Government owned material, special tools and test equipment presently available under Contracts AF33(615)-1872, NOW-63-0567-C, NOW-64-0184-C, NOW-64-0580-C, NOW-65-0602-C, NObsr-93184, Nobar-93185, DA28-043-AMC-00487(E), and NOW-62-40V.

PART VII - APPLICABILITY OF GENERAL PROVISIONS

A. Of the General Provisions attached hereto and made a part of this contract, the following clauses are hereby specifically declared inapplicable to this contract:

1. Clause 12 Renegotiation
2. Clause 36 Government Bill of Lading
3. Clause 41 Acknowledgement of Sponsorship

B. Clause 6, Examination of Records, of the General Provisions is modified to the extent that in both paragraph (a) and (b) wherever the words "Comptroller General of the United States" appear the words Contracting Officer are substituted therefor.

PART VIII - WAIVER OF REQUIREMENTS OF GENERAL PROVISIONS

Notwithstanding the requirements of any of the General Provisions of this contract to the contrary, whenever the Contractor, in performance of the work this contract, shall find that the requirements of any of the clauses of the General Provisions are in conflict with security instructions issued to the Contractor by the Contracting Officer or by his duly authorized representative for security matters, the Contractor shall call the attention of the Contracting Officer to such conflict and the Contracting Officer or his duly authorized representative for security matters shall (i) modify or rescind such security requirements or (ii) the Contracting Officer shall issue to the Contractor a waiver of compliance with the requirements of the General Provisions conflicting with such security requirements. Any waiver of compliance with the General Provisions of this contract issued by the Contracting Officer shall be in writing, except that the approval by the Contracting Officer of any subcontract issued hereunder by the Contractor shall be deemed to constitute approval of waiver of any clauses of the General Provisions in conflict with the stipulations of such subcontract.

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PART IX - SPECIAL SECURITY RESTRICTIONS

The Contractor shall not reveal (i) the specific nature or any details of the work being performed hereunder or (ii) any information whatsoever with respect to the department of the Government sponsoring this contract and the work thereunder except as the Contractor is directed or permitted in writing to reveal such information by the Contracting Officer or by his duly authorized representative for security matters, and notwithstanding any clause or section of this contract to the contrary, the Contractor shall not interpret any clause or section of this contract as requiring or permitting divulgence of such information to any person, public or private, or to any officer or department of the Government without the express consent of the Contracting Officer or his duly authorized representative for security matters.

PART X - ALTERATIONS IN SCHEDULE

The following alterations were made in this SCHEDULE prior to execution of this contract:

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